The Point

A magazine for and about the people of the
U.S. Army Medical Research and Materiel Command
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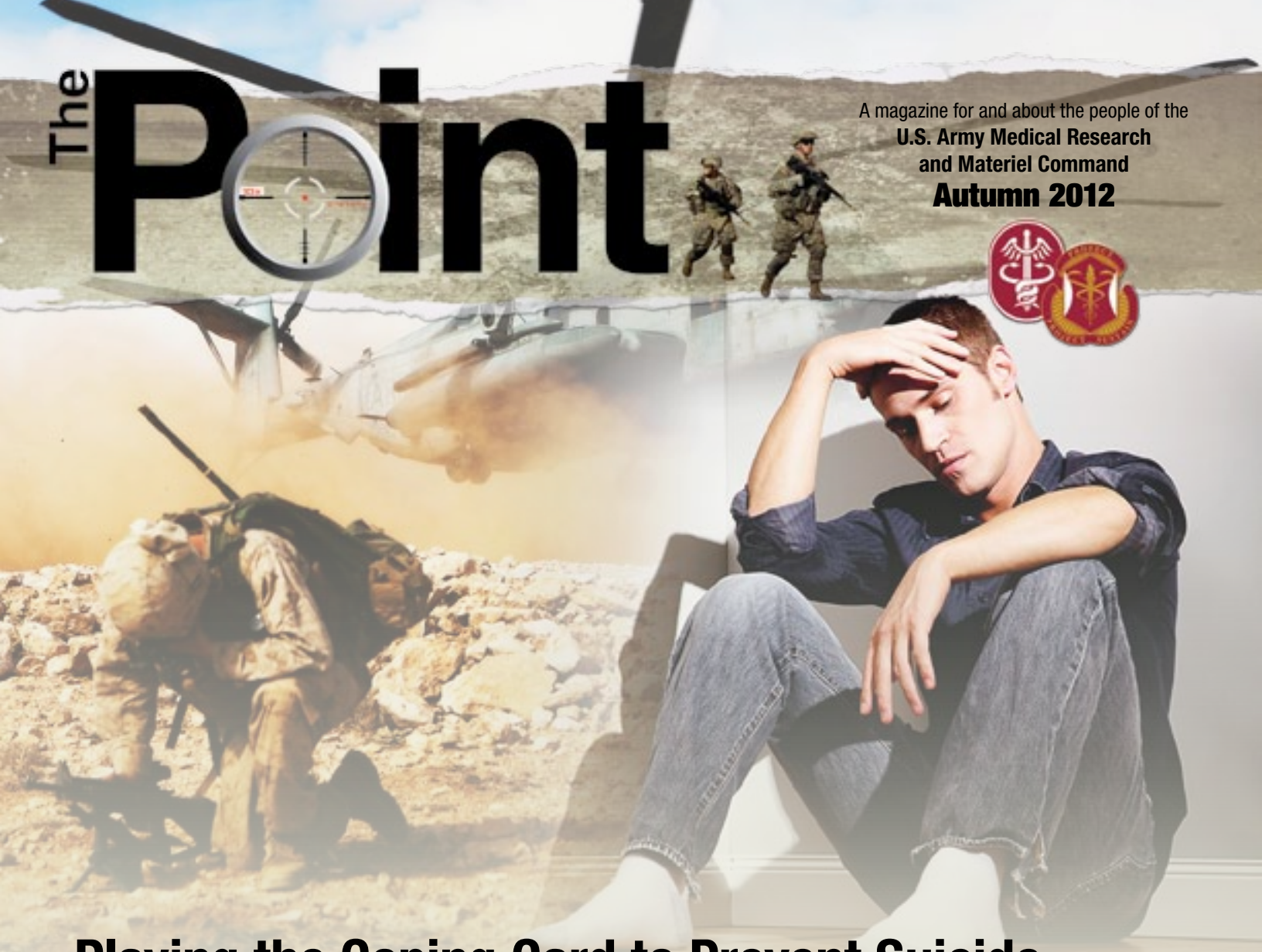


Playing the Coping Card to Prevent Suicide

The protection and treatment of Warfighters was a primary focus of the 2012 Military Health System Research Symposium held in Fort Lauderdale, Fla., in August. However, this concern for the men and women in uniform extends far beyond their time on the battlefield. The prevention of suicide among military personnel both during active duty and upon return remains at the forefront for the researchers and attendees of this year's conference.

In a breakout session dealing with advances in military suicide and psychological health research, Dr. Laura Neely of the Uniformed Services University of the Health Sciences in Bethesda, Md., offered insight regarding her study of Post Admission Cognitive Therapy for the prevention of suicide in military personnel with histories of trauma.

Working with Dr. Marjan Holloway, Neely's research shows that there is strong empirical support for the relationship between psychological trauma and suicide-related behaviors. However, she states that no evidence-based interventions exist for suicidal individuals with psychological trauma, as suicidal participants are often excluded from psychological research.

This is where PACT may help patients to cope effectively with suicidal thoughts and actions.

"The goal of our research," said Neely, "is to develop and empirically evaluate a brief inpatient cognitive behavioral treatment for individuals with psychological trauma who have attempted suicide."

Presenting statistics from the current Department of Defense Suicide Event Report, Neely said that of service members who had attempted suicide, 21.8 percent had prior psychiatric hospitalizations, and among those service members who died by suicide, at least 10 percent (and up to nearly 17 percent) had received inpatient psychiatric care.

"Out of all the various anxiety disorders," said Neely, "PTSD [post-traumatic stress disorder] has the strongest association with attempting suicide. And combined with alcohol-

continues next page

related problems, it increases the risk of suicide by sixfold."

Considering this, Neely's research may be quite important, as PTSD is a very active topic currently throughout the military population.

Neely's PACT program has three phases with two distinct therapy sessions in each phase. Phase I begins with an analysis of the patient's current suicide attempt, and this leads into a cognitive conceptualization of the events leading up to the attempted suicide. This involves retracing the thoughts of the individual to determine a mood set and behavior. Phase II moves into "cognitive restructuring" to review the negative automatic thoughts of the individual while looking for ways to modify these negative thoughts.

Neely said that when someone is in a highly emotional state, sometimes it is difficult to generate alternative ways of thinking so she suggests the use of "coping cards." These cards contain positive statements that provide support to the person who may be in jeopardy of self-destruction.

"Patients can carry these cards in their pocket," said Neely, "and every time that they have an [event] that leads to an emotional reaction, they can take this out and read it to themselves to start working on changing their thinking patterns and working on emotional regulation."

Dr. Laura Neely presents her work on suicide prevention in the military to attendees of the 2012 Military Health System Research Symposium in Fort Lauderdale, Fla., Aug. 15.
Photo by Jeffrey Soares

This second phase also includes the implementation of a "Hope Kit" in which patients keep positive reminders inside of a box that they can pull out to remind themselves of the good things in life — things worth living for. These items can include photos, coping cards, journals, gifts, or other things associated with good memories for the patient.

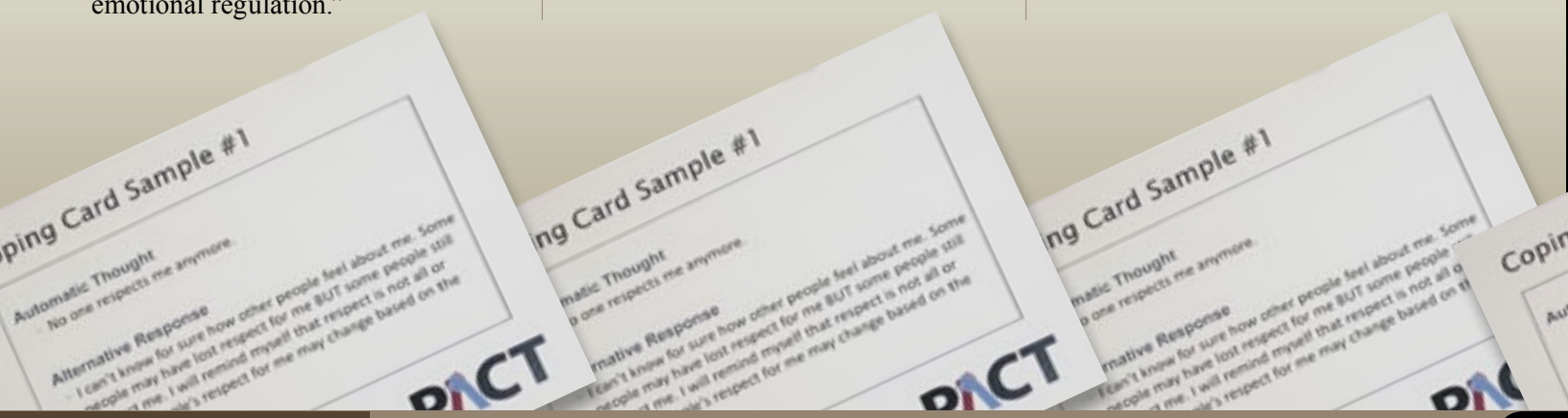
Finally, the sessions in Phase III are focused on relapse prevention and safety planning.

"In the final stage, we go through the suicide story again, but this time we rewrite it so the patient can incorporate her newly learned skills," said Neely.

In this stage, the patient must look for ways to challenge thoughts of negativity and suicide, and in doing so, should realize their own self-worth as well as the worthiness of people and things around them.

"We also have them create a 'safety plan' for when they're discharged," Neely said, "so that they know exactly what to do when they're in crisis."

Created by the patient, this safety plan not only contains certain scenarios of negative actions that the patient should watch for, but more importantly, it contains a list of positive reactions to use to squelch negative thoughts, as well as a list of contact persons who may help to calm down and reassure the patient.



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Of course, despite Neely's therapeutic approach to helping change the suicidal thoughts and actions of her patients, the patient's own readiness to change may often provide a roadblock that is difficult to overcome.

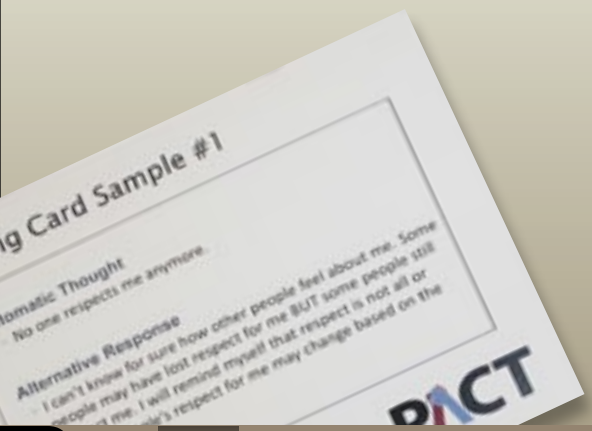
In the case of her clinical study patient, Neely said, "We focused on changing her negative automatic thoughts, which related to a sense of poor self-efficacy, coping with trauma, and other life domains."

Neely believes the results of this study clearly support the need for evidence-based psychotherapy research for traumatized suicidal individuals. Currently, her group is working on a manualized session-by-session inpatient cognitive behavioral treatment protocol for the treatment of trauma and suicide behavior.

When asked about patients' response to this PACT treatment program, Neely said that the reaction to this program has been very positive.

"I've had patients at the end of therapy say that this really helped them and that the individual attention was very important," said Neely. "Having this very intensive treatment is very helpful to them and having it completely tailored to their individual experiences is highly effective."

Jeffrey Soares
USAMRMC Public Affairs



Civil war medic re-enactors pose with Spc. Daniel Vita and Spc. William Lipscomb in front of the Wheeling ambulance used for casualty evacuation during the Civil War and the MRAP ambulance prototype used for casualty evacuation today. The two vehicles highlight the contrast of Army medicine over the past 150 years at the 150th anniversary of the Battle of Antietam, Pry House Field Hospital Museum, Keedysville, Md., Sept. 16.
Photo by Erin Bolling

Army Medicine: 150 Years Later

The chilly September morning gave light as the sun rose over the battlefield where the bloodiest single day in American military history took place 150 years ago. Nearly 23,000 people were killed, wounded, or missing during the Battle of Antietam (Maryland) Sept. 17, 1862. The Pry House was used as Union Headquarters during the battle, and the barn beside it was stationed as a field hospital. For the anniversary commemoration, the grounds of the Pry House Field Hospital Museum were transported back a century and a half as living historians from across the United States re-created the Pry House grounds during the Civil War. As part of the re-creation, a modern-day, Mine-Resistant Ambush-Protected ambulance prototype was displayed next to a Civil War-era ambulance.

The U.S. Army Medical Materiel Development Activity, Fort Detrick, Md., was invited to participate in the event and display a comparison of Civil War Army medicine to that of present day. USAMMDA provided the MRAP prototype, which sat beside the Civil War Wheeling ambulance. The contrast between the two ambulances was obvious; however, there were some striking similarities between the two. The Wheeling ambulance was a simple wooden wagon with four wooden wheels that could fit six ambulatory or two littered patients; it was drawn by horses and carried jugs of water on the back. The MRAP ambulance of today's Army is made of heavy-duty steel, has reinflating heavy-duty rubber wheels, and carries four ambulatory or two littered patients. It is drawn by a 370 horsepower diesel engine and carries jugs of water on the back as well as modern lifesaving equipment for treatment of serious injuries on the battlefield.

Thomas Frezza, superintendent of the Pry House Field Hospital Museum, National Museum of Civil War Medicine, described the comparison display as one of the major attractions of the weekend.

"It seems that the display was one of the most visited sites during the weekend," said Frezza. "I asked visitors what they thought, and a majority said that they were happy to see the two time periods represented and that they are glad to know what is being done to protect and treat our wounded on the battlefield today."

To aid in the presentation of the comparison, the MRAP ambulance was accompanied by two active duty Army medics, Spc. Daniel Vita and Spc. William Lipscomb, 68W health care specialists, at the U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick. The Soldiers gave firsthand experience

to visitors with regard to the medical equipment that Army medics use today. Vita acknowledged the differences in battlefield medicine, saying that the contrast is overwhelming not only from what the equipment is made of but how the whole scope of point-of-injury care has changed.

Steve Hawbecker, project manager of the Medical Support Systems Project Management Office, USAMMDA, provided subject matter expertise for the products on display as well as current projects in development, such as vehicles, shelters, and casualty evacuation and treatment equipment.

"The comparison of Army medicine past and present provided real insight into how the Soldier is now treated at the point of injury and throughout evacuation, not just removed from the battlefield as occurred in the Civil War." said Hawbecker. "Attendees at the event were very appreciative of the medical advances achieved by USAMMDA that exemplified the efforts the Army makes to save our wounded Soldiers."

The USAMMDA display included a wide range of current Army medical portfolio products, including the wheeled litter carrier, special medical emergency evacuation device, trauma tiered medic bag, improved first aid kit, and freeze-dried plasma.

As a young Soldier being a part of this event, Vita gained an enormous appreciation for the advances in medical technology.

"I took away from this experience a better understanding of where Army medicine began," said Vita. "What I was taught when I first began as a medic actually started at the Battle of Antietam with an officer named Major Letterman. It gives me a realization that the place I was standing, and what happened there, changed how things are done today."

Frezza estimated roughly 6,000 visitors toured the grounds of the Pry House over the weekend — a number the house has never seen before.

"It was a very successful event," said Frezza. "Visitors came away with a lot of knowledge, be it Civil War or today, and hopefully an experience that they will remember."

While the Army will continue making medical improvements and advances, it is important to not forget where it all started. We have been taught so much today from what occurred 150 years ago, on a battlefield not far from Fort Detrick, where so many men lost their lives.

Erin Bolling
USAMMDA

Spc. William Lipscomb teaches children about some of the tools that Soldiers use in the field at the 150th anniversary of the Battle of Antietam, Pry House Field Hospital Museum, Keedysville, Md., Sept. 16.

Photo by Erin Bolling

Displaying 150 years of Army medicine advancement, comparing the Wheeling ambulance used during the Civil War, and the MRAP ambulance prototype used today.

Photo by Scott Fullerton

Dr. Bill Smith (right) with longtime coworker and collaborator Clark Gross. Smith is credited with establishing a cell culture laboratory for the production of human cell cultures and tissue models used at USAMRICD for toxicological evaluations.

Photo courtesy of CRDEC/ECBC VI

Sulfur Mustard Expert Retires from USAMRICD

As he retires after 29 years of federal service at the U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, Md., Dr. William J. Smith will be remembered not only for his scientific expertise and research achievements but also for his leadership and contributions to the institute's business processes.

"Dr. Smith leaves behind an incredible legacy," said Col. Bruce Schoneboom, USAMRICD commander. "With his institutional knowledge and memory, he has been a great advisor for me since my arrival two months ago."

Smith served the institute in many different roles during his long career, as principal investigator, branch chief, and division chief. As additional duties, Smith was the research coordinator for the vesicant agents program, later the program advisor for cutaneous and ocular therapeutics, and more recently the coordinator for emerging threats. He established the first Good Laboratory Practices subcommittee of the institute's Executive Council and also served as chair of the Non-Traditional Agent Safety Committee.

In 2009, USAMRICD revamped its senior scientific leadership position to include changing the position title from scientific advisor to deputy to the commander for research, and Smith became acting DCR until the hiring action was completed in 2011. As such, Smith helped contextualize the position's responsibilities in the management of the institute's research portfolio.

"Bill took the DCR position for a dry run and helped make the position into what it is today," said Dr. John Graham, the current DCR. "Additionally, he was directly responsible for getting MRICD's Program Board of Advisors going during a time of great change. He had the foresight to see that teaming would become a requirement for doing business, and he strove to put that change in working environment into motion here at the institute."

Smith's career at USAMRICD began in 1968, following receipt of his bachelor's degree, when he accepted a position as a biologist with the Biomedical Laboratories at Edgewood Arsenal, the predecessor laboratory to USAMRICD. He left federal service in 1972 to work in the pharmaceutical/diagnostics industry and then sat on the faculty of the Johns Hopkins University School of Medicine. During these 15 years, he earned a master's degree in biology and a doctorate in biochemistry. He returned to USAMRICD in 1987 in an Intergovernmental Personnel Act assignment and was hired as a research biologist in November 1988.

Smith brought with him an extensive knowledge of tissue cultures and of the new technique of flow cytometry, according to longtime friend and collaborator Clark Gross. Most of his laboratory research was conducted using in vitro cell and tissue models derived from human tissue. Smith's laboratory was the first to establish the human epidermal keratinocyte as the predominant cellular model for studying mechanisms of vesication and cell death in vitro. His research has helped maintain USAMRICD's position as a leading Department of Defense laboratory in the field of alternative methods to animal use in toxicological research.

Smith's primary research focus at USAMRICD was the toxic mechanisms of sulfur mustard and the development of medical countermeasures against mustard's vesicating properties in human skin, eye, and lung. His many scientific contributions in the study of chemical warfare agent exposures led to advancements not only in understanding the effects of these agents, and even in physiology in general, but also in protecting the Warfighter from injury. Additionally, these have garnered him international recognition as a respected scientist foremost in the field of CWA-induced pathologies.

"As the mustard guru, Bill paved the way for most of the advances made in the field," said Graham. "His personal research efforts as well as his leadership of other scientists in their efforts resulted in a better understanding of the toxic effects of mustard as well as in getting us closer to an effective countermeasure."

Smith's research resulted in 88 peer-reviewed open literature scientific articles, 120 government-sponsored meeting publications, and 80 published scientific abstracts; he has been an invited speaker or served as a scientific session chair on 30 occasions. His international recognition resulted in his being an invited speaker at 15 international toxicology meetings and chair of 26 international symposia sessions on mustard vesication.

Additionally, Smith is a member of multiple international scientific societies, such as the American Society for Cell Biology, the Society of Toxicology, and the Society for In Vitro Biology. He served as president of the latter society from 2010 to 2012. He has also served on curriculum committees for the local community college and on dissertation committees at the University of Maryland, Baltimore. He has been a reviewer for more than eight scientific journals and a member of Source Selection Panels for USAMRICD and the U.S. Army Medical Research and Materiel Command, as well as an Integrated Process Team member for the Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology.

Another hallmark of Smith's career has been his mentorship of students and junior scientists. He has worked with all levels of the institute's scientific staff, and his laboratory was a training ground for 21 high school students under George Washington University's Science and Engineering Apprentice Program and for 23 post-baccalaureate student interns. He also was involved with the initiation of the institute's Blood Borne Pathogens course, which he taught for more than a decade.

At a retirement luncheon honoring Smith, Stephanie Russell, a former student who is now an Oak Ridge Institute of Science and Engineering intern at USAMRICD, spoke on behalf of all of the students who went through Smith's laboratory and thanked him for being such a caring and encouraging mentor. She described Smith as someone who "continues to strive to learn" and is "always willing to impart knowledge." He "demonstrated excellence" as a scientist but also advocated the importance of balancing one's career and personal life.

"You are a great example of the scientist I want to be," Russell said to Smith.

Smith credits the members of his research team for all of the successes in his career.

"I never had a greater mission in my life than to work for the Warfighter and the nation in the chem-bio defense program," said Smith.

In his retirement, Smith's "mission" will shift from protecting the Warfighter to helping individuals in the local community through several charitable initiatives sponsored by his church and supporting a number of independent nonprofit organizations.

USAMRICD Public Affairs

Navy Captain Sails Along as USAMRMC Deputy Commander

Capt. Keith A. Syring is the second naval officer to serve as deputy commander of the U.S. Army Medical Research and Materiel Command at Fort Detrick, Md.

Photo by Jeffrey Soares

This past June, the U.S. Army Medical Research and Materiel Command welcomed a new deputy commander to its team, Capt. Keith A. Syring of the U.S. Navy. Syring is the second naval officer to serve in this role, taking the baton from recently retired Navy Capt. J. Christopher Daniel. While an Army command, the USAMRMC is supported by the Navy and Air Force in its effort to create and deliver medical information and products for warfighting families throughout the world.

A native of southern New Jersey, Syring earned a bachelor's degree in biology from Rutgers University and a master's in public administration (health care) from Troy State University. In 1985, he accepted a commission as ensign in the Medical Service Corps, U.S. Naval Reserve, and one year later he earned his wings and was designated Naval Physiologist #147 at the Naval Aerospace Medical Institute, Pensacola, Fla. Upon serving as a preceptor at the Aviation Physiology Training Unit, NAS Norfolk, Va., he was assigned as the aeromedical safety officer for Marine Aircraft Group Eleven, MCAS El Toro, Ca. After various tours during nearly two decades as a naval officer, Syring was promoted to captain in 2006 and was selected to fill the deputy director position of the Marine Corps Safety Program. In 2007, he was assigned to the Navy's Bureau of Medicine and Surgery as the Aerospace Physiology program manager and specialty leader.

Syring's two most recent assignments place him in a unique group of service members. In 2010, he became the first commanding officer of the Naval Medical Research Unit–Dayton at Wright Patterson Air Force Base, Ohio, and this year he relocated to Fort Detrick, Md., to serve as deputy commander for USAMRMC. With this most recent assignment, Syring's resume will now include tours in support of all four branches of the U.S. military. His awards include the Legion of Merit, Meritorious Service Medal (3), Navy and Marine Corps Commendation Medal (2), and the Navy and Marine Corps Achievement Medal.

Recently, I sat down with Syring to discuss his first three months as USAMRMC's deputy commander, and the captain's jovial nature rose to the forefront immediately. Combining business with pleasure, Syring's attitude is not only very positive, but it is also highly mission focused.

Q: ***How have the first three months been for you as deputy commander of USAMRMC?***

A: The first three months have been a whirlwind, to say the least. It has been amazing to see just how far reaching this command is and how large it is. When I was at the MNRU in Dayton, I saw only a small piece of the medical research side of the military. Here at the MRMC, you see the whole picture — from basic research and development all the way through to fielding the systems and then supporting them once they're fielded. And I really enjoy meeting and working with the people here at MRMC. They're fantastic and so hard working. And my assistant Deborah [McLeod-Baumbach] has been so welcoming and helpful during my transition here, along with the entire staff, of course. It's phenomenal to see the devotion everyone here has to the mission.

Q: ***As a Navy captain, what has it been like to move over into the Army command environment?***

A: Well, first of all, there's a bit of confusion with regard to rank because the rank names between the Army and Navy do not necessarily correspond. A captain in the Navy isn't the same level as a captain in the Army rank wise so that may confuse some people. I know it confused a lot of people when I was a Navy lieutenant on tour with the Marines, and it provided many entertaining stories for me! Also, many acronyms aren't the same for the two branches so I'm doing my best to learn the Army acronyms so I don't send out the wrong message! It certainly keeps me on my toes, but I still come to work every day so that's good!

Q: ***What are your thoughts on being the second naval officer to serve as deputy commander for the Command?***

A: I believe the Army took a big risk in reaching out to the Navy for a deputy commander in the first place, and Capt. Daniel did such a tremendous job in this role. His background was a bit different than mine, and he accomplished quite a bit during his tour here. I don't know Chris well, but I certainly know of his achievements as a naval officer so I feel I have to continue to raise the bar for our branch as we progress forward with the Army in this operation. In working together successfully, I believe this sets the tone for other branches and organizations to show them that we need to collaborate more in order to be more successful and further our accomplishments. This really is a very important joint effort for everyone involved.

Q: ***In light of this, what do you hope to accomplish as you complete your tour here at MRMC?***

A: Well, as I said, one of the things I'd like to do is to build upon my predecessor's accomplishments. My tour here is three years, although I will be up for retirement in about two and a half, so during this time I hope to continue to build the relationships between all of the services with regard to the MRMC's mission of protecting and maintaining our Warfighters. As you know, the Army, Navy, and Air Force all work together in fulfilling the mission of the MRMC, and I'd like to do my part in making sure that collaboration continues to strengthen and prosper as a joint operation for our service members and their families. On that note, I have to say that in coming over to the Army side, I was really impressed with how the Army places primary focus on its Soldiers and their families. Throughout the many meetings and functions I've attended, it is very clear to see that the MRMC's mission is a very sincere and passionate one. And I'm happy to be a part of that.

Q: ***Finally, how do you and your family like living in the Frederick area? How does the Fort Detrick community compare to that of your last assignment in Dayton, Ohio?***

A: Oh, we love it here! The people are just wonderful, and the farmland is what we're used to, coming from southern New Jersey. We love that we have mountains in view and lots of farmland. It's only my wife and I here in Frederick, but one of our daughters lives nearby in Owings Mills, and another daughter lives in Morgantown, W. Va., so we see them often. Our third daughter is in Abu Dhabi so that's not as close! But we've settled in a really nice community in Walkersville, and we just love it. What has amazed me the most is how supportive the people in Frederick are toward service members in the area. I can't tell you how many folks have come up to me in stores and restaurants, when I'm in uniform, to thank me for my service and to share heartfelt stories of their own time in the military. I've met veterans who served in World War II and Korea, as well as other missions. We couldn't have asked for a better place to live! And on top of this, I really like that we're so close to Civil War historical sites, as well as the culture and museums of Washington and Baltimore. We're really going to enjoy our time here — it just the icing on the cake!

Jeffrey Soares
USAMRMC Public Affairs

Army Research Helps Firefighter Recruits Reduce Injury

Dr. Barry Spiering, a research physiologist with USARIEM, takes part in a controlled burn exercise at the MFA in Stowe, Mass., while conducting a study to prevent injury in recruits Sept. 5.

Courtesy photo

Researchers at Natick's U. S. Army Research Institute of Environmental Medicine have teamed up with the Massachusetts Firefighting Academy in Stow, Mass., in an effort to reduce injuries in recruits.

The MFA contacted USARIEM's Military Performance Division and asked researchers to evaluate its physical training program for recruits after seeing a spike in training-related injuries.

Instructors for the 12-week program noticed that recruits were showing up not fully ready to handle the physical stress that comes with the academy. As a result, recruits were frequently lost to injury.

"We noticed a recurring pattern of injury with firefighting recruits and reached out to Natick Labs for their specialized expertise on Soldier performance," MFA director Edmund Walker said. "Our hope was that they could assist us in evaluating the tasks of fighting fires to better prepare our recruits to be successful."

Dr. Barry Spiering, a research physiologist with USARIEM, attended three meetings with the MFA, including an orientation 60 days prior to the recruits reporting to their first day of the academy. He then returned at week 10 of the program to observe and assess recruits during a controlled burn.

Spiering said that injuries, including rhabdomyolysis, frequently occur in highly physically demanding occupations when people exert themselves before they are ready for the stress of that particular job.

"We see muscular injuries like rhabdomyolysis often when a person is less fit and not ready for the stress they are about to put on their body," Spiering said. "Rhabdomyolysis is a severe case of injury but can often happen to people in occupations like firefighting and the military."

Rhabdomyolysis is the breakdown of muscle fibers that leads to the release of muscle fiber contents into the bloodstream. This is harmful to the kidney and can often cause kidney damage.

Spiering said that with proper knowledge and preparation, however, muscular injuries can be avoided.

"During the orientation, recruits were given educational lectures on health, went through circuit training with weighted gear on their bodies, and were given a workout plan they could perform at home in preparation of their upcoming training," Spiering said. "My goal during this time was to observe and evaluate the effectiveness of the recruit orientation program and send my recommendations to the instructors of the MFA."

The result at week 10 when Spiering returned was that no recruits were lost to injury, which was not often the case in prior classes. Spiering said that the orientation was appropriate and pragmatic for reducing injuries.

"The steps that the MFA have taken to reduce recruits' injury are appropriate," Spiering said. "They have done a great job to reduce injury, and this orientation program shows that they are doing the right thing."

Walker said he fully agrees.

"The orientation has helped these young men and women understand their responsibility to themselves if they want to be successful in our firefighter recruit training program," Walker said. "The results have been exactly what we hoped for."

Kelly Sullivan
USARIEM Public Affairs

The dual-mode Noise Immune Stethoscope.

Courtesy photo

New Stethoscope Designed for Use in Noisy Environments

In collaboration with Active Signal Technologies, a Small Business Innovation Research partner, the U.S. Army Areomedical Research Laboratory has developed a stethoscope that can be used to listen to heart and lung sounds in high-noise environments, such as medical evacuation vehicles.

The Noise Immune Stethoscope, like classic acoustic stethoscopes, uses a traditional acoustic listening mode but also adds ultrasound-based technology that is "noise immune" to amplify heart and lung sounds. This technology has the capability for users to easily switch from Doppler to acoustic mode. Both modes immediately turn body sounds into electrical signals for enhanced performance. The Communications Earplug, currently being used by aviators, attaches to the NIS, and allows auscultation while wearing the flight helmet.

Heart and lung sounds are a necessary component of casualty triage and ongoing care. Hearing and assessing these sounds with traditional acoustic stethoscopes is very difficult on the battlefield. It is vitally important that military medical care providers have the necessary tools to identify the diagnosis and course of treatment. The NIS enables medical personnel to assess abnormalities of the cardiopulmonary system in high-noise environments, such as the transportation of wounded Soldiers in medical evacuation aircraft, ground warfare, and intensive care units.

"The dual-mode stethoscope is specifically designed for high-noise conditions. As a result, the fight surgeon or flight medic will be able to make more accurate decisions while en route to higher echelons of care during flight," said Maj. Tim Cho, USAARL Aeromedical Factors branch chief.

After the development of the NIS at USAARL, researchers began to assess the utility and durability of the new stethoscope under field conditions and in patients with cardiopulmonary pathology. During 2011, the development of the NIS accomplished numerous significant milestones. The NIS received U.S. Food and Drug Administration 510(k) clearance and, through a series of rigorous laboratory and field tests conducted by USAARL, the NIS received an airworthiness release for use on board the Black Hawk helicopter. A 2011 research study conducted on board the USS Vinson by USAARL highlighted clinicians' ease of use of the NIS acoustic mode for identifying patients' heart and lung sounds during high-noise operations.

Currently, a second study is being conducted by USAARL at Madigan Army Medical Center in Washington where data collection is under way to identify cardiopulmonary pathology using the NIS. This study is scheduled to be completed in fiscal year 2013.

Scott Brady, U.S. Army Medical Materiel Agency medical devices product manager, anticipates that within the next year, the final steps will be under way to assign the NIS to the appropriate sets, kits, and outfits so the device can be used on patients in real-world operational environments.

Catherine Davis
USAARL Public Affairs

GEMS Gains in the Education of

GEMS + Summertime Science = Fun

GEMS student interns participate in the "CSI" Forensic Lab where they are given background information and have to conduct hands-on experiments in blood typing, fingerprinting, and hair analysis to figure out who committed a crime.

Photo by Kelly Sullivan, USARIEM

For the second year in a row, the U.S. Army Research Institute of Environmental Medicine, Natick, Mass., hosted the Gains in the Education of Mathematics and Science program at Natick Soldier Systems Center.

GEMS is an extracurricular summer science education program that enables students to experience science in a real laboratory setting. The GEMS program at USARIEM began during the summer of 2011 with 50 students enrolled in two GEMS I programs.

This past summer the program grew to three GEMS I programs with 75 students, followed by two intermediate, or GEMS II, programs. GEMS II offers the 50 students from last summer the chance to come back and test more advanced experiments.

While exploring the GEMS I program this year, student interns investigated problem solving, estimation, water properties, physics/forces of motion, and forensics. Students received a stipend to participate in these four-day programs.

Margaret Sparicio, a student intern who will be in 9th grade this fall, participated in the third session of the GEMS I program. She said this program has really ignited an interest in the sciences for her.

"This week has been really fun," Sparicio said. "I have taken a little science in previous years, but this has been amazing. I definitely want to take more science classes in school now."

The program is based on a multidisciplinary educational curriculum and focused on age- and grade-appropriate hands-on activities in areas such as science, engineering, mathematics, computational sciences, computational biology, biomedical sciences, chemistry, and biology.

Advanced high school and college-aged students called near-peer mentors lead the GEMS I and II programs and serve as role models for the students. Near-peer mentors completed extensive training where they learned how to conduct and teach the GEMS experiments at a science boot camp prior to the student interns' arrival.

The near-peer mentors were also charged with developing the curriculum for the GEMS II program. Daniel Eggers, a teacher at Weymouth High School and the resource teacher for the GEMS program, said that it is the near-peer mentors who make the program exceptional.

Mathematics and Science

"Each mentor has contributed a lot to the curriculum this year based on their personal interests," Eggers said. "It is their responsibility to make sure the whole program goes smoothly from day to day, from leading tours to doing administrative tasks to taking on a leadership role in the classes, the near-peer mentors have been phenomenal."

In 2005, a bipartisan panel composed of the House of Representatives and Senators asked the National Academies of Science and Medicine what could be done to strengthen America's position in the global economy in the areas of mathematics and sciences. This panel was concerned that our future work force would be losing jobs in the areas of science and technology.

The answer from the National Academies of Science and Medicine was that there needed to be summer internships for middle and high school students aimed at engaging them in mathematics and science.

The Army created the GEMS program as part of this realization that science and mathematics are important to instill in younger generations for future prosperity. According to the Army, it has a long history of recognizing that a scientifically and technologically literate citizenry is this country's best hope for a secure, rewarding, and successful future.

The GEMS program began as a single program at Walter Reed in 2005 and has expanded to 12 programs across the major Army research installations, including the one at USARIEM.

Dr. (Lt. Col.) Timothy Haley, a clinical director at USARIEM and organizer of the USARIEM GEMS program, said his main goal is to get local Natick students excited about science and engineering.

"The GEMS programs at USARIEM are not only helping to lead to the goals and objectives of the Academies," Haley said. "This is also a wonderful opportunity to showcase the work that is done at Natick Soldier Systems Center to the general community."

Haley, who is a pediatrician, felt that his background prepared him to create the different training scenarios for the students participating in the program. His goal for the GEMS program is that it continues to grow.

"We have received extremely positive feedback from the students and the parents about GEMS," Haley said. "We hope to add GEMS III to the program next year. My goal also is to help set up a GEMS conference where the leaders of each of the programs can come together and continue to make this great program better."

Kelly Sullivan
USARIEM Public Affairs

GEMS Gains in the Education of

Justin Casteel, a beginning GEMS student, dissects a cow eyeball.

GEMS Students Transform into Scientists

The U.S. Army Aeromedical Research Laboratory led the second annual Gains in the Education of Mathematics and Science program this past summer.

Col. Dana Renta, USAARL commander, hosted a beginning and intermediate program that provided local students with weeklong sessions of math and science experiments.

The GEMS program is a U.S. Army Educational Outreach Program that educates students in the areas of science, technology, engineering, and mathematics and is structured to increase students' career interests in these areas by engaging them in hands-on experiments.

USAARL's beginning program, composed of 50 students who completed fifth or sixth grade during the 2011–2012 school year, explored the five senses (hearing, sight, taste, smell, and touch). The beginning program curriculum was tailored to incorporate USAARL's research of the brain and neurological processes. For an advanced learning experience, USAARL led an intermediate program that included 35, seventh- and eighth-grade students. The intermediate science and math experiments focused primarily on chemistry, biology, and biochemistry.

"Sarah Thiel, GEMS lead resource teacher, put a lot of time and energy into designing the GEMS curricula to ensure that the experiments were not only age appropriate but also exciting," said Lori St. Onge, GEMS program coordinator.

"The GEMS experiments challenged the students to practice problem-solving techniques," said Sarah Thiel, GEMS lead resource teacher.

GEMS is designed to have college-age, near-peer mentors lead the program and serve as role models for the students. The 2012 GEMS mentors were Jessica Cumbee (lead mentor, Georgia College and State University), Kristen Simpson (Auburn University), David McKeon (University of Alabama at Birmingham), Madeleine King (Auburn University), Angela Dani (University of Iowa), and Lana Lynn (University of California, Berkeley). The mentors completed GEMS curricula training before the start of the program and then used their knowledge about the experiments to teach the students.

"From the beginning, I knew our mentors were outstanding," said Thiel. "After watching them interact with the students, I have no doubt that these mentors positively impacted the lives of the students and that the students positively influenced the mentors."

Each session of the USAARL GEMS program concluded with a tour of USAARL, a showcase during which the students presented their favorite experiments to family and friends, and a graduation ceremony.

During the tour, military and civilian researchers demonstrated and explained how they collect data and conduct experiments to help protect Soldiers.

Mathematics and Science

"Before the students conducted their experiments during the week, I explained the relevance between our experiments and USAARL's research," Thiel said. "As we toured the lab, I could see the students' wheels turning in their heads. I felt a sense of achievement that some of our GEMS students may one day grow up to be Department of the Army scientists and engineers."

Each graduation ceremony included an introduction of all GEMS staff members, the presentation of a certificate and $50 stipend to each student, and presentations from a guest speaker. Maj. Gen. Anthony Crutchfield, U.S. Army Aviation Center of Excellence and Fort Rucker commanding general, was the guest of honor at the ceremony for the first session of GEMS. He praised the students for their efforts toward becoming future scientists and their parents for helping them achieve such success.

During the ceremony for the second session of GEMS, Ben Mozo, developer of the Communications Earplug and vice president of Communications & Ear Protection, Inc., encouraged students to think outside of the box to one day develop and patent a new product. Students in the third session were encouraged by Dr. Matthew Hughes, dean of Instruction at Enterprise State Community College in Enterprise, Ala., to continue their studies and pursue college degrees. During the ceremony for the fourth and final session of GEMS, Dr. Christopher King, associate professor in the Department of Chemistry at Troy University, instructed students not only to learn science but also to develop strong communication and writing skills.

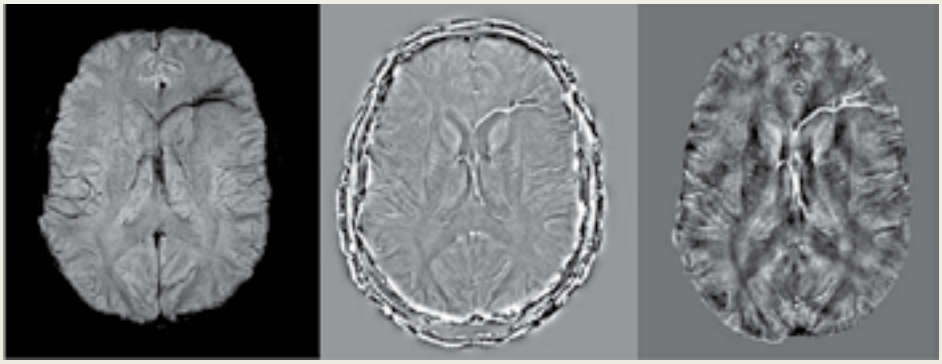
After another year of positive responses to the GEMS program, USAARL is planning to host the program again next summer and hopes to add a new program level for third and fourth graders.

Catherine Davis
USAARL Public Affairs

Nykia Hanner, an intermediate GEMS student, tests the pH levels of common household liquids.

Intermediate students of the USAARL GEMS program. Clockwise from bottom left: Jami Smith, Nathan Pool, Angela Dani (mentor), Drazen Alvarez, and Helen Elizabeth Brinyark.

New Imaging Technique Detects Changes in Veins That May Better Illuminate Brain Injury



A mild traumatic brain injury case in the presence of both blast and subsequent traumatic brain injury. The left septal vein and medullary veins draining into it both show abnormal signal representing either iron deposition, increased levels of deoxyhemoglobin, or both. Left image: SWI data. Middle image: SWI filtered phase. Right image: SWIM data showing quantified iron content.

Images courtesy of Dr. E. Mark Haacke, Tilak Gattu, Dr. A. Cacace, and Dr. F. Akin

A new dimension in imaging technology detects minute levels of vascular damage in the form of bleeding, clots, and reduced levels of oxygenation that may better illuminate our understanding of brain injury, particularly related to trauma. Currently, the U.S. Army Medical Research and Materiel Command's Telemedicine and Advanced Technology Research Center is managing a related project that is being led by Dr. E. Mark Haacke of Wayne State University.

Haacke recently presented his work in susceptibility weighted imaging and mapping, or SWIM, to a national panel of military and civilian medical experts. In this current project, he is exploring advanced magnetic resonance imaging methods and SWIM to improve diagnosis and outcome prediction of mild traumatic brain injury.

TATRC director Col. Karl Friedl noted, "This study is just one example of the promising research that TATRC supports. Collaborations among the investigators we bring together may lead to creative solutions we hadn't imagined."

In 1997, Haacke's team developed susceptibility weighted imaging, a highly sensitive technique to detect the presence of blood products. According to Haacke, it has been proved to be the most sensitive approach to visualizing cerebral microbleeds and shearing of vessels in traumatic brain injury.

"These conditions do seem to be reliable indicators of injury because we have imaged hundreds of adults over the years, of all ages, and rarely find them in the normal control population," said Haacke.

In recent years, Haacke's team and other neuroimaging researchers have applied concepts similar to SWIM to provide a new measure of iron content through quantitative susceptibility mapping. Haacke's approach, SWIM, is a rapid method that not only provides a quantitative map of iron but at the same time reveals the presence of cerebral microbleeds and abnormal veins. Iron in the form of deoxyhemoglobin can also be used to measure changes in local oxygen saturation, important for evaluating potential changes in local blood flow or tissue function (similar to what is seen in stroke using SWI). SWIM can also be used to monitor changes in iron content over time to see if previous iron deposition is being resorbed or if bleeding continues, both important diagnostic pieces of information for the clinician.

"SWIM is among the highest quality and fastest types of quantitative susceptibility mapping," said Haacke. "We believe it could be in much wider use in about a year."

Haacke has been working with researchers throughout the world for more than five years applying his techniques specifically to traumatic brain injury, stroke, Parkinson's disease, and multiple sclerosis. In this current project, he has demonstrated that there is a lower impact load, either inertia or direct impact forces, which may damage only veins, and he has shown medullary vein damage that has not been visualized with other techniques. The medullary veins drain the frontal white matter of the brain so reduced blood flow here could possibly impair the higher level frontal neurocognitive functions. In light of this, treatments that improve blood flow to the brain may be a promising direction to pursue.

While many investigators have focused on arterial changes related to brain injuries, Haacke has remained focused on the veins.

"Veins have relatively more fragile vessel walls than arteries and are more susceptible to damage during head injury," said Haacke. "This important component of the vascular system is often overlooked but may help us better diagnose what is wrong."

Dr. Anthony Pacifico, who manages TATRC's Medical Imaging Technologies Portfolio, said, "Dr. Haacke's team has a different slant for studying these injury regions that may lead to a new avenue in diagnosis and treatment for traumatic or other types of brain injury."

"For instance, the study of dementia could well benefit from SWI and SWIM," said Haacke. "Perhaps as much as one-third of all dementia is vascular dementia."

Haacke and Dr. Zhifeng Kou are working to complete a larger database of normal and mildly brain-injured imaging scans and define the appropriate parameters so that SWIM can be run at most clinical sites.

TATRC manages leading-edge research in various areas of medicine and technology, seeking synergies among projects that may quickly advance new products into the field to improve the care of the nation's Warfighters.

Barb Ruppert
TATRC science writer

Gina Jurek, a USAARL research program coordinator and associate investigator, presents Chief Warrant Officer 5 Bradley Garfield, officer in charge of the U.S. Marine Corps WTB in Virginia, with the Army Achievement Medal, on behalf of Col. Dana K. Renta, USAARL commander.
Photo courtesy of USAARL

Marine Commander Receives Army Medal

Gina Jurek, a U.S. Army Aeromedical Research Laboratory research program coordinator and associate investigator, presented Chief Warrant Officer 5 Bradley Garfield, officer in charge of the U.S. Marine Corps Weapons Training Battalion, Methods of Entry School in Virginia, with the Army Achievement Medal, on behalf of Col. Dana K. Renta, USAARL commander.

For approximately one year, USAARL and the Marine Corps WTB in Quantico, Va., have collaborated on a research study that aims to examine the effects of controlled repetitive blast exposures on the visual system of Marine Corps instructors assigned to the Marine Corps WTB, Methods of Entry School.

Garfield was recognized for providing consistent and outstanding coordination and support of the research project since September 2010.

"Garfield demonstrated exceptional leadership and support for the USAARL study by helping to set up the data collection area, coordinating through the Marine Corps channels for study-related permissions, assisting with Cadre participant scheduling, and ensuring USAARL had adequate support when necessary," said Jurek.

The study, "The Effects of Controlled Repetitive Blasts on the Visual System," examines the effects of repeated blast exposure on binocular function (i.e., phorias and stereopsis, fusion, and fixation), contrast sensitivity, color vision, accommodation, pupillary responses, visual field, corneal endothelium, and ocular tissue integrity using a battery of standard, clinical ophthalmic tests administered multiple times over a two-year period.

Catherine Davis
USAARL Public Affairs

Military and Civilian Partnerships for Trauma Care

Dr. Thomas Scalea, physician-in-chief of the University of Maryland Shock Trauma Center, Baltimore, Md., presents his thoughts on military-civilian partnerships in trauma care at the 2012 Military Health System Research Symposium in Fort Lauderdale, Fla., Aug. 13.

At the 2012 Military Health System Research Symposium held in August, there was an overriding philosophy that strong partnerships lead to successful research. No one knows this better than Dr. Thomas Scalea, physician-in-chief of the University of Maryland Shock Trauma Center, Baltimore, Md., whose group has teamed with the U.S. military to advance the study and treatment of severe injuries in both the military and civilian sectors.

Scalea said that the military-civilian partnership over the years has yielded a tremendous amount of "cross-pollination" of clinical care in mostly trauma and critical care scenarios. What was born out of necessity on the battlefield has grown into a vital operation in saving lives daily, from bustling city streets to quiet neighborhoods, to ensure that severely wounded patients are treated as quickly as possible.

"Evacuation of casualties — helicopter transport — that was born in Korea and Vietnam has really morphed into the civilian sector in a big way," said Scalea, "and we are now involved in a very large discussion on who ought to be transported by ground and who should get flown — but all of that really started in the military."

Today, Scalea's team at Maryland's Shock Trauma Center uses medical concepts that originated in combat casualty care, and his tour of U.S. military operations overseas in Afghanistan has helped to shape his vision.

"The whole concept of damage control resuscitation was started on the battlefield," said Scalea, "and all of that [research] has gone from the battlefield into civilian practice."

The military's system of critical care air transport, which involves transporting battlefield victims to military hospitals, has helped to define the current practice of "life-flighting" civilian patients with serious wounds to hospitals via helicopter directly from the accident scene.

Of this method Scalea said, "I really got the idea for this when I was in Afghanistan. I said, 'We can do this, but we just need to use it in a different way.'"

Tourniquets, shunts, local haemostatic dressings, and various other medical items are going from the battlefield, sometimes directly, into civilian practice. Military doctors with their invaluable experience are coming out of the services and bringing their knowledge to civilian sectors.

The partnership between military and civilian medical practitioners over the years has led to many breakthroughs in life-saving procedures, and the basis for this concept of early intervention was championed decades ago by the man who would eventually create Maryland's Shock Trauma Center, R. Adams Cowley.

In praising Cowley, Scalea said, "It was R.A. Cowley who came back from [the war in] Korea with the concept that injury was a 'time-sensitive' disease, and he then coined the term 'the Golden Hour.' Cowley believed that there is a 'golden hour' between life and death, and if you're critically injured, you have less than 60 minutes to live. In his mind, he already had the concept of irreversible shock."

As modern-day medicine evolves along with the strengthening of military-civilian partnerships in the field, Scalea said that two strong examples of real innovation in this partnering are comprehensive facial transplantation and reviewing genetic profiles to drive care and treatment. Both of these avenues have seen great successes recently, and he remains confident that more success stories of this unique collaboration will be seen in the not-too-distant future.

Jeffrey Soares
USAMRMC Public Affairs

NATO medical officers from five different countries received a tour of USAMMCE during the ERMC Multinational Medical Conference in Pirmasens, Germany, Sept. 12.

Photo by Doris Crittenden, USAMMCE Public Affairs

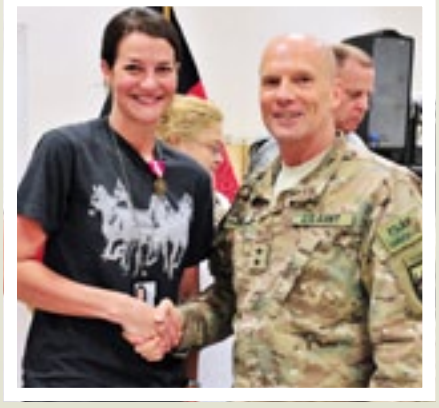
ERMC Multinational Medical Conference Attendees Visit USAMMCE

Lt. Col. Christopher Todd, deputy commander for Operations of the U.S. Army Medical Materiel Center, Europe, provided a tour of the USAMMCE Installation to attendees of the Europe Regional Medical Command Multinational Medical Conference in Pirmasens, Germany, Sept. 12.

Approximately 20 North Atlantic Treaty Organization medical officers from five different countries received a first-hand look at the USAMMCE operation. Some of the feedback received from the officers included comments such as "great operation," "fantastic work that these folks perform," "unbelievable—had no clue that such a place existed," and "very organized and people friendly."

Prior to the tour, Todd delivered the USAMMCE command brief at the Landstuhl Regional Medical Center, Germany.

Doris Crittenden
USAMMCE Public Affairs



Maj. Gen. Kenneth Dahl, USFOR-A deputy commanding general for Support, congratulates Mary Profitt on receiving the Superior Civilian Service Medal at New Kabul Compound, Afghanistan.

Photo by Clifford Wendel

Profitt Receives Award for Superior Civilian Service

Mary Profitt received the Superior Civilian Service Medal for her contributions as the U.S. Forces-Afghanistan ground safety manager. The award was for the period of Jan. 24 – Sep. 13, 2012, and during this time, Profitt's efforts resulted in significant contributions to the effectiveness and success of the USFOR-A Safety Program. For the remainder of her deployment, Profitt will move from her current position to assume the role of safety manager for the entire Capital Region that falls under Task Force Centurion, which includes eight U.S. bases in the Kabul, Afghanistan, area.

Employed by the U.S. Army Medical Research and Materiel Command, Fort Detrick, Md., Profitt is a Safety and Occupational Health specialist in the USAMRMC Surety, Safety, and Environmental office.

USAMRMC Public Affairs

Saving Face

At the 2012 Military Health System Research Symposium held in Fort Lauderdale, Fla., this past August, high-tech programs and products were discussed by a multitude of researchers focused on translating futuristic technology into modern-day practice.

In the 1990 sci-fi film, "Total Recall," Arnold Schwarzenegger's character receives a new face via high-tech methods so that he can elude pursuers. The image, at once both intriguing and disturbing, causes viewers to imagine a world where something such as this is not only possible but typical. Today, thanks to the work of researchers such as Dr. Eduardo Rodriquez of the University of Maryland, providing a new face to someone in need is on its way to becoming "typical."

In his presentation, "Comprehensive Facial Transplantation," Rodriquez conveyed how he and his massive surgical team at Maryland used every resource available during a 36-hour surgery to attach a healthy donor face to a 37-year-old gunshot victim whose own face was grossly disfigured. The procedure is considered to be the most extensive operation of its kind ever performed.

And the results are both surprising and remarkable.

Although this particular patient, Richard Lee Norris, was a civilian from rural Virginia, Rodriquez's initial plan was to treat the extreme facial wounds inflicted upon Warfighters on the battlefield.

"The ultimate goal of this project was to treat the wounded warrior," said Rodriquez. "We wanted to develop a strategy that would essentially reconstruct the massive disfigurement of the face of these Soldiers [wounded in battle]."

Col. Robert Hale, U.S. Army Institute of Surgical Research; Dr. Eduardo Rodriquez, University of Maryland; and Col. Dallas Hack, USAMRMC Combat Casualty Care Research Program at the 2012 Military Health System Research Symposium, Aug. 14.

Photo by Jeffrey Soares

"If you look at our data at the [R. A. Cowley] Shock Trauma Unit, approximately 15 percent of the patients that come through have some form of facial injury, and in the data from the Journal of Trauma, approximately 30 percent of all wounded warriors have some form of facial injury," he said. "The ultimate goal is not only to make these patients and Soldiers appear well but to also ensure that they function normally."

Rodriquez said that many massive facial injuries have been the result of today's improvised explosive devices, used frequently by rebels in combat scenarios, and from high-energy ballistic injuries that, unfortunately, these Soldiers or patients suffer.

"As injuries between the lower face and upper face are considered very difficult injuries to treat, the operation to repair these injuries must be proportionate to the problem in order to take these patients to the next level," said Rodriquez.

Working within the Shock Trauma Center in Baltimore, Md., Rodriquez and his team — specialists in craniofacial surgery and microsurgery — spent hundreds of hours in rigorous training and rehearsal before the patient ever entered the operating room. In a procedure of this magnitude, no margin of error could be tolerated by the surgical team. They studied the underlying relevant clinical anatomy to ensure proper transplantation, and they also considered the procedure from an aesthetic perspective to see where incisions could be placed to go undetected.

The team used computerized surgical planning to ensure the exact transfer of the donor face to the patient, and they were extremely thorough in aligning the oral/dental/tongue configuration during the transfer to ensure that the patient could chew and speak correctly.

Considering the magnitude of this procedure, it is nothing short of amaz-

Dr. Eduardo Rodriquez of the University of Maryland describes the complex process of craniofacial reconstruction.

Photo courtesy of AP

ing that the patient is recovering on schedule at this time. In fact, upon showing a comparison photo of Norris prior to and following the extensive surgery, Rodriquez himself appeared a bit surprised — and pleased — about the recovery.

"You can appreciate the dramatic change in this individual's not only appearance but also function," said Rodriquez. "This would not have been possible with conventional measures."

Most would agree that this is an understatement.

The doctor and his team hope to continue with the state-of-the-art craniofacial reconstruction they provide from their facility in Maryland, and Rodriquez looks to maintain, ideally, a goal of 3–5 facial transplantation surgeries per year.

Jeffrey Soares
USAMRMC Public Affairs

Sgt. Anthony Coleman (left) and Sgt. Jason Roth of USAMMCE participated in the EFMB competition at Grafenwoehr, Germany. Both non-commissioned officers earned the prestigious award Sept. 21.

Photo courtesy of USAMMCE

USAMMCE NCOs Earn Expert Field Medical Badge

Sgt. Anthony Coleman and Sgt. Jason Roth, both assigned to the U.S. Army Medical Materiel Center, Europe, earned the Expert Field Medical Badge at Grafenwoehr, Germany, Sept. 21.

Out of 312 multinational candidates from across Europe, 75 earned the much desired badge. The average completion rate is approximately 20 percent.

The EFMB competition is a two-week course consisting of a one-week training phase and a 120-hour testing phase. The testing phase includes a written test, day and night land navigation, a 12 mile ruck march, and three combat testing lanes with basic combat scenarios and combat medical skills. To earn the badge, Soldiers must complete all tasks and cross the finish line within the allotted time.

In a ceremony following the event, Lt. Gen. Mark Hertling, commanding general of the U.S. Army Europe, pinned the badges on the winners. In addition, Col. Thomas C. Slade, USAMMCE commander, presented the USAMMCE winners with a Commander's coin.

Upon returning to work, Roth said, "The most challenging task was probably the written test. Finding time to study, and the vast variety of possible questions and subjects, made that portion very tough for me. I don't think anyone can actually go into EFMB and think they fully have it in the bag."

Coleman agreed that the written test was the most challenging task for him as well.

"At first I was nervous about Combat Testing Lane 1," said Coleman, "but we managed to get some time to go over the lane so that helped."

In an e-mail message to all of USAMMCE, Slade stated that he is extremely proud of these two young non-commissioned officers.

Doris Crittenden
USAMMCE Public Affairs

Army Explores Tactical 4G Telemedicine

The U.S. Army explored whether real-time, electronic point-of-treatment care was possible or practical this summer at its integrated capabilities test bed at Fort Dix, N.J.

Courtesy photo

The U.S. Army explored whether real-time, electronic point-of-treatment care was possible or practical this summer at its integrated capabilities test bed at Fort Dix, N.J.

Key medical and technical personnel from the U.S. Army Medical Research and Materiel Command and the U.S. Army Research, Development and Engineering Command combined prototype medical military software with commercial handheld technologies and tactical 4G networks to send medical information from the point of injury on the battlefield back to the doctor for real-time communication and decision making.

"It's going to build confidence in the medic on the field that's isolated with a severely wounded Soldier," said Carl Manemeit, Physiological Monitoring project lead for USAMRMC's Telemedicine and Advanced Technology Research Center.

"If you've ever seen the movie, 'Black Hawk Down,' the medic is trying to treat the guy with the artery issue in his leg; the medic goes through all his resources, and once he exhausted all his knowledge, he was stuck," Manemeit said. "If he had been connected to the surgeons back at the treatment facility, they could have given him more guidance on how to save that Soldier's life. By injecting this expertise, we might be able to do that one thing that could save some guy's life; that's what we're looking to do."

Medics utilized portable physiological monitoring devices with streaming video and voice and photo capability, and sent electronic Tactical Casualty Care Cards over a tactical network to the surgical facility so surgeons could see injuries and what treatment had been performed prior to the patient's arrival.

"There's an information gap that lies between the point of injury on the field and point of treatment back at a medical facility," said Dr. Gary R. Gilbert, TATRC Research, Development, Test, and Evaluation program manager for Secure Telemedicine. "We need to do a better job of being able to record what the medic saw and did prior to the patient being evacuated to the treatment facility, and we want this record to be transmitted to the Soldier's permanent health records."

"Now when the patient goes to a combat support hospital or gets back to Walter Reed for further care, the doctors can see what happened in the field, and five years from now when the patient goes into a VA hospital seeking treatment, the care providers can see everything that's been done," Gilbert said.

Currently, medics fill out a paper TC3 that's attached to the injured Soldier before evacuation to the battalion aid station or the combat support hospital. In some cases, the TC3 never makes it back to the treatment facility, and the information never makes it to the patient records.

"One of the issues I had with the card is that it's a piece of paper held on with a metal wire," said Spc. Daniel Vita, U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick, Md. "Pretty much, you would have attached it to the patient through his zipper or around his wrist, but you potentially had the problem of ripping the paper from the metal loop."

Vita, who was a medic with the 130th Engineer Brigade Headquarters

in Iraq, preferred using tape and a sharpie because "it stayed."

"I like the idea of an electronic TC3 because it's simpler," Vita said. "It's a lot easier for the information to get to where it needs to go and it makes it legible. When you filled out a TC3 card and put it on the patient, they didn't know what was happening until that patient and card got to them. Now doing it electronically, you can send it ahead to the level two or three so they have an idea of what kinds of patients and casualties are coming in."

The combination of secure tactical communications and knowledge management may also help brigade surgeons prioritize treatment and evacuation assets so the most critically injured can be treated first.

"The Army uses MEDEVAC, but the bad news is that it costs about $20,000 per patient flight," said Dave Williams, project manager for Theater Tele-Health Initiatives, TATRC. "And if you have six assets and 12 patients, who should they get first? If we can determine which patients can be held and which can be treated and stabilized on-site, it might be a less expensive way to save a patient's life."

The work was performed at the integrated capabilities test bed operated by Product Director Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance and Network Modernization, a research and development program within U.S. Army RDECOM's Communications-Electronics Research, Development, and Engineering Center.

"This is a forgiving environment because it's designed for testing and solution proving," Gilbert said. "If things don't work, that's OK; you find out what doesn't work and you fix it here. There are a lot of technologies required to make this work, and we don't have all of these. CERDEC is helping to fill in those gaps by providing a variety of radio capabilities that you wouldn't get at a real brigade: SRW, WNW, ANW2, deployable 4G, Airborne relay, connection to Army WIN-T. They provide the infrastructure, and we just bring the application."

PD C4ISR and Network Modernization focuses on the future network, near term and several years out, providing the Army with a relevant venue to assess next-generation technologies and facilitate technology maturation. The program is also a key component in CERDEC's support of the agile acquisition process, utilizing its field laboratory environment to perform risk mitigation and candidate assessment/selection for future network integration rehearsal/exercise events.

"These guys are not only preparing the current force to be successful, they're closing the gaps for the future force with each iteration of these integrated capabilities events," Williams said. "You don't solve all the problems in one 12-month cycle. This venue is providing the medics an opportunity to get inside the Program Objective Memorandum cycle to come up with those solutions and iteratively solve them as technologies emerge and grow with us. This has been a complete team effort to develop a solution that did not exist six years ago."

This is the third year that PD C4ISR and Network Modernization has examined network capabilities that could support the medic/first responder's mission.

During 2011, PD C4ISR and Network Modernization combined fielded tactical radios, such as the Enhanced Position Location Reporting System with the Soldier Radio Waveform, to see if it was possible and feasible to provide enhanced bandwidth and over-the-horizon communications for handheld medical data. This year, a 4G cellular mesh network was implemented using SRW to bridge back to the tactical network.

"We're examining how best to combine the future and current so we can enable the medical community to perform their mission more efficiently," said Jason Sypniewski, chief for PD C4ISR and Network Modernization's Integrated Event Design and Analysis branch. "We're looking at the Soldier Radio Waveform because it's a self-healing waveform that allows non-line-of-sight communication; that's the vision for where the Army wants to go. We've looked at EPLRS because it's an existing asset on which the medical community could recapitalize."

"Cellular technology could be the future of telehealth on the modern battlefield, but we need to know if it can be done, and if so, would it actually enhance the delivery of information?" Sypniewski said. "As decision makers look at network modernization, this is the type of information they will want in order to help them make informed decisions regarding telemedicine capabilities and the networks on which they're going to ride. Our mission is to provide this."

Edric Thompson
CERDEC

A Greater Understanding of the First Effective HIV Vaccine – RV144

Scientists used genetic sequencing to discover new evidence that the first vaccine shown to prevent HIV infection in people also affected the viruses in those who did become infected. Viruses with two genetic "footprints" were associated with greater vaccine efficacy. The results were published in September in the online edition of the journal *Nature*.

"This is the first time that we have seen pressure on the virus at the genetic level due to an effective HIV vaccine," said Dr. Morgane Rolland, a scientist at the U.S. Military HIV Research Program and lead author of the study.

The analysis revealed evidence of a vaccine-induced immune response on two sites of the Env-V2 region located on HIV's outer coat. For viruses carrying these two particular signatures, the vaccine efficacy increased to 80 percent.

"These findings reinforce both the RV144 result and the previous study showing that antibodies directed at the V1V2 region reduce the risk of infection. Taken together the work suggests that the Env-V2 region could be a critical target for future HIV vaccines," noted Col. Jerome Kim, senior author on the study.

"Genetic sequencing is an important and independent assessment of the immune responses induced by the vaccine," said Dr. Paul Edlefsen, a biostatistician at the Statistical Center for HIV/AIDS Research and Prevention who co-led the study.

Researchers examined HIV genome sequences from 110 volunteers who participated in the Thai HIV vaccine

About RV144

Results from RV144, an Army-led clinical trial involving more than 16,000 adult volunteers in Thailand, were published in the *New England Journal of Medicine* in 2009. The results showed that the prime-boost combination of ALVAC® HIV and AIDSVAX® B/E was safe and lowered the rate of HIV infection by an estimated 31.2 percent compared with placebo (p=0.04). These data provided the first evidence in humans that a safe and effective preventive HIV vaccine is possible.

Results from extensive RV144 laboratory studies were published April 5, 2012 in the *New England Journal of Medicine*. These studies showed that antibodies (IgG) specific to a particular region (called V1V2) of the HIV outer coat (envelope protein) correlated with lower infection rates among those who were vaccinated.

About MHRP

The U.S. Military HIV Research Program at the Walter Reed Army Institute of Research conducts research to develop an effective HIV vaccine and integrates prevention, treatment, diagnosis, and monitoring as part of a global effort to protect troops and reduce the impact of HIV worldwide. The MHRP has six clinical research sites in the U.S., Africa, and Asia. The program successfully collaborates on HIV prevention care and treatment services, funded by the President's Emergency Plan for AIDS Relief, with African militaries and in the communities where it conducts research. For more information, visit www.hivresearch.org.

Photos courtesy of the U.S. Military HIV Research Program

trial, RV144, and who subsequently became infected with HIV. Results indicated that the HIV viruses infecting trial participants were different in persons who received vaccine compared to those who received placebo.

Researchers focused their analysis on the V2 portion of the HIV virus after a study published earlier in 2012 found that antibodies specific to the V1V2 region of the HIV genome correlated with lower risk of infection. This new genetic sequencing study showed that the viruses that broke through or escaped from these immune responses have genetic differences in the same V2 region, indicating that the vaccine exerted pressure in this region.

HIV viruses that escape from antibodies and manage to infect a person have genetic footprints, or mutations, that can prevent them from being recognized by the immune system. These changes can be seen in the genetic sequence of the virus. The research team sequenced more than a thousand full-length viruses to look very carefully at which changes corresponded to "escape" mutations.

"This study underscores the realistic optimism you see in the HIV vaccine research field today," said Col. Nelson Michael, director of the MHRP. "We are making substantive progress in understanding what it will take to develop a more effective HIV vaccine, which will ultimately help us end this pandemic."

The study team included researchers with the U.S. Army's MHRP at the Walter Reed Army Institute of Research, the Statistical Center for HIV/AIDS Research and Prevention at the Fred Hutchinson Cancer Research Center, and the University of Washington. The project was supported by the National Institute of Allergy and Infectious Diseases, part of the National Institutes of Health, and a cooperative agreement between the Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., and the U.S. Department of Defense.

Lisa Reilly,
communications director
U.S. Military HIV
Research Program

Airborne troops participate in the annual paradrop at Ginkel Heath in the Netherlands.

Courtesy photo

USAARL Officer Awarded British Military Parachute Wings

Lt. Col. Steve Gaydos, a U.S. Army Aeromedical Research Laboratory research exchange flight surgeon with the British Army Air Corps in Middle Wallop, United Kingdom, volunteered to participate in the 68th Annual Operation Market Garden World War II commemoration airborne jump in the Netherlands Sept. 22.

Operation Market Garden, the largest military airborne operation fought in the Netherlands and Germany, took place in September 1944. However, the airborne force's mission to seize a number of bridges to allow for the rapid advancement of Allied armored troops into Northern Germany was ultimately unsuccessful.

"Market Garden was such a historic operation during World War II," said Gaydos.

During the 18-day commemoration, a ceremony was held in remembrance of the Operation Market Garden airborne forces. One thousand airborne troops from seven different countries participate in the annual paradrop at Ginkel Heath.

Gaydos jumped with British paratroopers from the 16th Air Assault Brigade and was awarded British Military Parachute Wings.

"I was honored to have the opportunity to participate in the commemoration ceremonies with my British colleagues," said Gaydos.

Operation Market Garden was popularized in the films, "Theirs is the Glory" and "A Bridge Too Far," as well as in scenes of "Band of Brothers."

Catherine Davis
USAARL Public Affairs

USAMRU-E Goes Five Years DUI Free

An Army medicine unit in Europe was recently recognized for reaching a rare milestone in keeping its members safe.

The U.S. Army Medical Research Unit-Europe at Heidelberg's Nachrichten Kaserne has had no incidents of driving while intoxicated/driving under the influence for five years. The unit may have been DUI free for more than five years, but the current tracking system has only been in use since 2007.

Four other Europe-based medical units—Headquarters and Headquarters Company Bavaria Medical Department Activity, Livorno (Italy) Health Clinic, Kleber Health Clinic in Kaiserslautern, and the Stuttgart Army Health Clinic—were also recognized for reaching the five-year milestone.

Europe Regional Medical Command safety manager Carol Fontanese said that everyone, from the private to the field grade officer, has a responsibility in reducing drunk driving incidents.

"Achieving this accomplishment is a reflection of engaged leadership and Soldiers taking care of Soldiers," Fontanese said. "Soldiers within ERMC are aware of how a DUI/DWI can change someone's life and are engaged in ensuring Soldiers have a plan in place for off-duty activities to allow for safe transportation home."

"Soldiers were encouraged to take care of Soldiers…to embrace a culture of safety," Fontanese said. This included actions such as having plans in place for a non-drinking friend or family member to drive them home if they would be drinking alcohol.

"Of course as with all Army units, there is command emphasis on safety, accountability, and responsibility. That has always been the case here and still is," said Lt. Col. Jeffrey Thomas, USAMRU-E commander. "More than that, being a small unit means we are a cohesive team of Soldiers and civilians who look out for each other as a team/family. I think commanders in the past and current staff have understood that dynamic. We take care of each other and have had a supportive climate for unit members."

Each unit will receive a plaque handmade by another safety award winner, Staff Sgt. Lon Mullaney, who recently received the U.S. Army Medical Command Individual Award of Excellence in Safety. Mullaney volunteers at the MWR Wood Shop on Patton Barracks.

"Sergeant Mullaney volunteered to make the DUI/DWI plaques for units who achieve one, two, three, four, and five years DUI/DWI free," Fontanese said. "This is another example of Soldiers and NCOs leading the way to ensure safety first and always."

Each unit will also receive a three-day pass to recognize this achievement.

ERMC Command Sgt. Maj. Robert Luciano said these units exemplify the Army value of integrity.

"Soldiers need to do the right thing both on- and off-duty, and that's exactly what these Soldiers are doing," Luciano said. "This is also a testament to the hard work and positive influence of unit NCOs and Senior NCOs."

Ed Drohan
ERMC Public Affairs

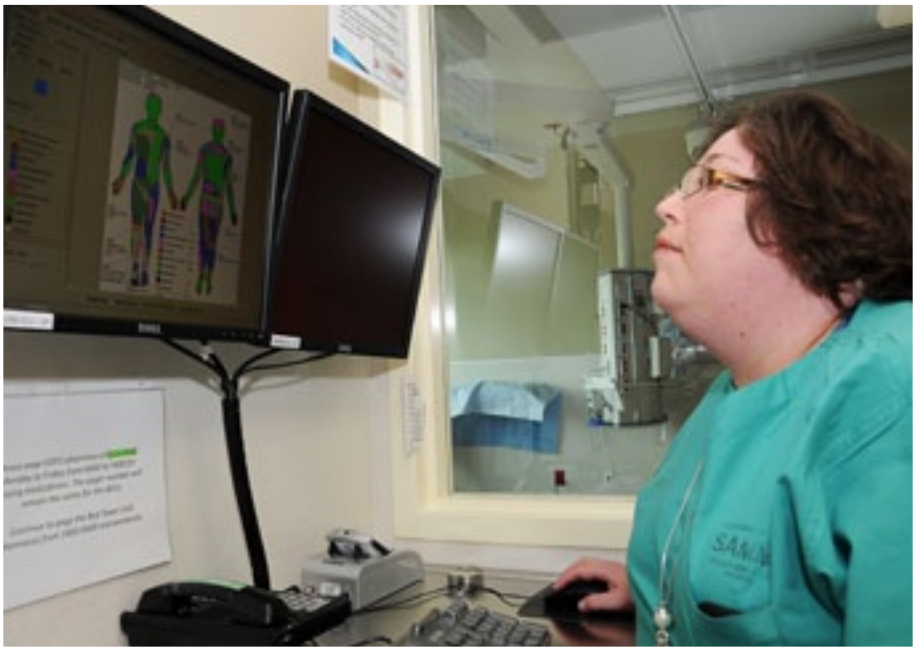
USAMRICD Presentation Receives Award at S&T Colloquium

Scientists from the U.S. Army Medical Research Institute of Chemical Defense, Aberdeen Proving Ground, Md., received an award for best presentation in the subject area of medical countermeasures at a science and technology colloquium held by the Joint Science and Technology Office of the Defense Threat Reduction Agency. The colloquium took place at the Edgewood Area of Aberdeen Proving Ground Sept. 19–21. The poster and accompanying manuscript, "Chiral Separation, Quantitation, Characterization and Preparative Isolation of Compounds for Screening Catalytic Bioscavenger Enzymes," were authored by Dr. Shane Kasten, along with Takwen Kajih, Tom Rusek, Douglas Cerasoli, and Sean Hodgins.

In recognition of the award, Kasten was presented with a crystal plate. According to Cerasoli, lead scientist for the USAMRICD research team, the award determinations for each topic covered at the meeting were made by a panel of independent experts who evaluated the quality of the posters, presentations, and manuscripts prior to the start of the colloquium.

USAMRICD Public Affairs

Wound Flow Improving Burn Center Patient Care



Sarah Shingleton, a senior BICU wound coordinator at the USAISR Burn Center, views a patient's burn care management history using the Wound Flow electronic wound mapping software program.

Photo courtesy of USAISR

A product developed at the U.S. Army Institute of Surgical Research at Fort Sam Houston, Texas, will be one of the new technologies presented at the annual World's Best Technology Expo in October 2012. The expo will showcase 132 new technologies developed across the United States and Canada from top universities, laboratories, and research institutions with the USAISR being one of two Army research institutes invited to present at this year's expo.

According to USAISR's Comprehensive Intensive Care Research task area manager, Jose Salinas, Ph.D., Wound Flow is an electronic mapping software program used at the USAISR Burn Center to determine the percentage of total body surface area burns and wounds on patients, and it is also a tool used to determine burn care management.

"Wound Flow was developed because of a need. It was designed to help to improve burn care by providing burn teams with a tool that lets them track patients' progression in the burn intensive care unit a lot more accurately," said Salinas. "It also lets you upload images, which is very critical.

"Before, we used to take photos of the patient, and those photos would get archived and the clinician would never see them again. With this system, as soon as you map a patient, you can take photos of the wounds and upload them with the digital map so that clinicians can see how the map of the patient is along with the images of how the injury looks."

Wound Flow replaced the paper-and-pencil mapping diagram used by clinicians when admitting patients to the Burn Center. Often, the paper version would be placed in the patient's chart and seldom used by the burn team or would be lost. Sarah Shingleton, a senior BICU wound coordinator, has been using the program since being introduced at the Burn Center.

"I think it's a great tool," Shingleton said. "It has improved our burn care for our patients because we use it every day to discuss the patient's progress, the types of dressing being used, and the areas that need special attention."

Digital photos and bronchoscope images of the lungs and trachea can be uploaded during the mapping of the patients, and clinicians can use various colors to depict the degree of the burns, amputations, and other wounds. Once the electronic diagram has been completed, Wound Flow automatically does the math to determine the TBSA. As the patient heals, clinicians can update the diagram to track the heal rate.

"The system is very easy to use," said Shingleton. "It's very user friendly and has a lot of nice features. You can learn the system in five minutes."

The Burn Center staff has taken advantage of Wound Flow by using it as a training tool for students, new nursing staff, surgical residents, and military personnel preparing to deploy.

"It has been an incredible and useful tool for the Burn Center to be able to give clinicians a much better situational awareness of our burn patients," Salinas said.

Steven Galvan
USAISR Public Affairs

Ambassador Laura E. Kennedy (front row, center left) with ambassadors from Geneva visiting the National Interagency Biodefense Campus at Fort Detrick, Md., July 24.

Photo by Doug Valentine

International Diplomats Visit U.S. National Interagency Biodefense Campus at Fort Detrick

Visitors were shown the Genomics Center during their tour of USAMRIID July 24.

Photo by Dave Rolls

Following up on the Bio-Transparency and Openness Initiative announced by Secretary of State Hillary Clinton at the December 2011 Biological and Toxin Weapons Convention Review Conference, the U.S. hosted a visit to its National Interagency Biodefense Campus at Fort Detrick, Md., July 24.

Ambassador Laura E. Kennedy, U.S. Special Representative for BWC Issues, accompanied a group of ambassadors posted to Switzerland, including the current BWC chairman, Algerian Ambassador Delmi. The program included visits to the U.S. Army Medical Research Institute of Infectious Diseases and the National Biodefense Analysis and Countermeasures Center of the Department of Homeland Security.

Senior officials from the Departments of Defense, Homeland Security, Health and Human Services, and Agriculture and the Federal Bureau of Investigation briefed on the various components that make up the Biodefense Campus and described the "whole of government" approach the U.S. embraces for biodefense, as well as international cooperation and assistance in this vital area.

Caree Vander-Linden
USAMRIID Public Affairs

USAARL

Meritorious Service Medal
Lt. Col. Jose Capo-Aponte

Legion of Merit
Lt. Col. Jose Capo-Aponte

Army Commendation Medal
Sgt. Kareem Clayborne
Capt. Michael Dretsch
Capt. Nick Spangler

Certificate of Appreciation
Staff Sgt. Craig Berlin
Victor Estes
Jeff Holemo

Certificate of Achievement
Spc. Yesenia Contreras
Spc. Elise Corrado
Staff Sgt. Jeff Molles
Spc. Hilary Phillips

CSM Hustle Award
Pfc. Monica Ang
Spc. Yesenia Contreras
Spc. Tabitha Garcia
Spc. Daniel Lopez
Spc. Hilary Phillips
Spc. Stanslaus Simiyu

Meritorious Volunteer Service Medal
Sgt. Kareem Clayborne

Promotion
Maj. Antonio Blue

USAMMA

Legion of Merit
Master Sgt. Monica A. Carr
Sgt. Maj. Michael Osburn

6MLMC

Meritorious Service Medal
Sgt. Maj. Edward G. Kelsey

WRAIR

Meritorious Service Medal
Staff Sgt. Francois Brown
Chief Warrant Officer 2 Brian A. Crowe
Maj. Bryan T. Gnade
Lt. Col. Christopher Keller
Maj. Anjali N. Kunz
Col. Arthur G. Lyons
Lt. Col. Julie M. Stephensdevalle
Maj. Cyruss Tsurgeon

Legion of Merit
Col. Kevin M. McNabb
Col. Charles Milliken
Col. Douglas Walsh

June

Achievement Medal for Civilian Service
Robert Kaminski

Superior Civilian Service Award
Gabriela Zollner-Romero

Special Act
Tarshieka Campbell
Aqil Lynch
William Murray
Matthew Robert
Joshua Soderberg
Mark Spriggs

July

Certificate of Achievement
Lander McClure

Performance Award
Amy Adler
Kathleen Wright

Special Act
Christina Marie Del Valle
Heather Isaac
Sheree Lee (2)
Lander McClure
Leslie Thompson Muldrow
Jeraun Thompkins
Prasanthi Tipparaju

Time Off Award
Jody Ference
Burton Lewis
Albert Maxwell
Maryanne Vahey

August

Achievement Medal for Civilian Service
Carolyn Hales
Amy Summers

Performance Award
Lance Rahey

Special Act
German Caranto
Phillip Collins
Deborah Davis
Stephanie Freeman
Larry Kelsey
George Martin
Stephen Nnam (2)
Janak Rajani (2)
Andrew Rogalski
Gabriela Romero
Daniel Santos

Time Off Award
Timothy Cannon
Doug Davis
Roberta Nicolella
David Spivock

September

Time Off Award
Deborah Davis
Prasanthi Tipparaju

USAMRICD

Meritorious Service Medal
Lt. Col. Derron A. Alves
Sgt. 1st Class Timothy H. Frock
Capt. Sean M. Palmer

Legion of Merit
Col. Peter Schultheiss

Army Commendation Medal
Spc. Sharifq Baksh
Sgt. 1st Class Daniel Boutz
Staff Sgt. Tarvin Smith
Capt. Matthew Taylor
Master Sgt. Carlos Wright

Army Achievement Medal
Staff Sgt. Tarvin Smith

Military Outstanding Volunteer Service Medal
Maj. Scott Willens

Soldier of the Quarter
Spc. Francisco J. Calderon

NCO of the Quarter
Staff Sgt. Gary A. Hall

Commander's Award for Civilian Service
Paula Adkins
James Dillman
Debra Lee
Robyn Lee
Lloyd Roberts

Achievement Medal for Civilian Service
Joanne Holloway
Cindy Kronman

Promotion
Staff Sgt. Zachary Phillips

Reenlistment
Spc. Luis Cains (4 years)

USAMRMC

Meritorious Service Medal
Maj. Pedro Bonilla-Vasquez
Maj. Parnell Coleman

Legion of Merit
Col. Carl A. Castro
Col. Dallas C. Hack

USAISR

Meritorious Service Medal
Sgt. 1st Class Victor Balderama
Maj. Margaret Hanson
Spc. Jesse C. Wu

Legion of Merit
Col. Brian Eastridge
Col. John G. McManus

USAMRIID

Meritorious Service Medal
1st Sgt. Carson E. Auman
Staff Sgt. Marco Carrington

USAMMDA

Meritorious Service Medal
Col. Richard Gonzales
Lt. Col. Cindy Landgren

USARIEM

Meritorious Service Medal
Capt. David W. Degroot
Capt. Stefan M. Pasiakos